REMARKS

Claims 24-26 and 28-48 are pending in the present application. Reconsideration and allowance of pending claims 24-26 and 28-48 in view of the following remarks are requested.

The Examiner has rejected claims 24-26 and 28-48 under 35 USC §103(a) as being unpatentable over U.S. patent number 6,069,397 to Cornett et al. ("Cornett") in view of U.S. patent number 5,446,311 to Ewen et al. ("Ewen"). For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by independent claims 24, 31, and 37, is patentably distinguishable over Cornett and Ewen, singly or in combination thereof.

The present invention, as defined by independent claims 24 and 37, respectively, teaches, among other things, a conductor or inductor patterned in a "second area" of a dielectric, where a permeability conversion material is interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a "first area" of the dielectric, and where the permeability conversion material is not situated underneath the conductor or inductor. As disclosed in the present application, the permeability conversion material is interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is increased, while a mask prevents the permeability conversion material from entering the first area of the dielectric. As a result, the permeability of the second area of the dielectric is higher than the first area of the same dielectric.

Thus, by increasing the permeability of an area of a dielectric by interspersing permeability conversion material within the dielectric area and masking another area of the dielectric so as to prevent the permeability conversion material from entering that area, the present invention achieves control over the particular area of the dielectric in which the permeability conversion material is dispersed. For example, the permeability conversion material may be dispersed only in an area of the dielectric that includes an inductor, and not in a neighboring dielectric area of the same dielectric layer. Thus, the present invention advantageously allows a choice of increasing the permeability of an area of a dielectric after fabrication of an inductor in that area of the dielectric, while not increasing the permeability of an adjacent area of the dielectric.

Additionally, as disclosed in the present application, through "interspersing," a high permeability material is introduced into a dielectric material that already surrounds an inductor. In other words, a high permeability material is "interspersed" into the dielectric material after the dielectric material and the inductor have been fabricated. Since the high permeability material is "interspersed" into the dielectric material after the dielectric material and the inductor have been fabricated, the high permeability material is not situated underneath the inductor.

Furthermore, by interspersing the permeability conversion material within the second area of the dielectric, the amount of permeability conversion material can be advantageously controlled to achieve a desired increase in the permeability of the second area of the dielectric after patterning of an inductor in the second area of the dielectric.

For example, a small amount of very high permeability material, such as a nickel-iron alloy, interspersed within the second area of the dielectric can result in a significant increase in the permeability of the second area of the dielectric.

In contrast, Cornett does not teach, disclose, or suggest a permeability conversion material interspersed within a second area of a dielectric including an inductor or conductor, such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the permeability conversion material is not situated underneath the inductor or conductor.

Cornett specifically discloses inductor layer 220 implemented as a layer of integrated circuit 200. See, for example, Cornett, column 2, lines 17-18. Inductor layer 220 includes patterned conductive trace 110, i.e. an inductor, and is formed by depositing a first layer of magnetic material, i.e. magnetic material layer 221, on passivation layer 217. Conductive trace 110 is then patterned on magnetic material layer 221 and a second layer of magnetic material, i.e. magnetic material layer 223, is disposed on both patterned conductive trace 110, i.e. an inductor, and magnetic material layer 221. See, for example, Cornett, column 2, lines 43-48.

Thus, in Cornett, passivation layer 217 is not part of the same dielectric layer as either magnetic material layer 221 or magnetic material layer 223. Furthermore, Cornett does not teach, disclose, or suggest a permeability conversion material interspersed within a second area of a dielectric including an inductor or conductor, such that the permeability

of the second area of the dielectric is higher than the permeability of a first area of the dielectric, as required by independent claims 24 and 37.

Additionally, in Cornett, the same magnetic material, such as amorphous copper ferrite material, is utilized in both magnetic material layer 221 and magnetic material layer 223. Thus, in Cornett, since conductive trace 110, i.e. an inductor, is patterned on magnetic layer 221, magnetic material must be situated underneath conductive trace 110. Moreover, Cornett does not teach, disclose, or suggest not situating magnetic material underneath conductive trace 110.

In contrast to the present invention, Ewen does not teach, disclose, or suggest a permeability conversion material that is "interspersed" within a second area of a dielectric including an inductor or conductor, such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the permeability conversion material is not situated underneath the inductor or conductor. Ewen specifically discloses a spiral inductor structure having three levels of metal connected by vias. See, for example, Ewen, column 2, lines 11-28. Each metal level is, in turn, situated on a layer of silicon oxide to isolate the metal levels. See, for example, Ewen, column 2, lines 14-24. However, Ewen does not teach, disclose, or suggest an increased permeability of any of the silicon oxide layers resulting form interspersion of permeability conversion material within the silicon oxide layer. In fact, Ewen does not teach, disclose, or suggest increasing the permeability of any of the silicon oxide layer in any manner.

For the foregoing reasons, Applicant respectfully submits that the present invention as defined by independent claims 24 and 37 is not suggested, disclosed, or taught by Ewen, either singly, or in combination with Cornett. Thus, independent claims 24 and 37 are patentably distinguishable over Cornett and Ewen and, as such, claims 25 and 26 and claims 28-30 depending from independent claim 24; and claims 38-48 depending from independent claim 37 are, *a fortiori*, also patentably distinguishable over Cornett and Ewen for at least the reasons presented above and also for additional limitations contained in each dependent claim.

The present invention, as defined by independent claim 31, teaches, among other things, an inductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the second permeability is greater than the first permeability, and where the permeability conversion material is not situated underneath the inductor. Thus, as discussed above, the permeability conversion material is interspersed within the dielectric to increase the permeability of the dielectric. The fact that a permeability conversion material is interspersed within a dielectric, where the permeability of the permeability conversion material is greater than the permeability of the dielectric, where the dielectric surrounds the inductor prior to receiving interspersed permeability conversion material, and where the permeability conversion material is not situated underneath the inductor, results in the various advantages discussed above.

As such, and based on the foregoing reasons in relation to independent claims 24 and 37, independent claim 31 is also patentably distinguishable over Cornett and Ewen, either singly or in combination. Thus, claims 32-36 depending from independent claim 31 are also patentably distinguishable over Cornett and Ewen for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Based on the foregoing reasons, the present invention, as defined by independent claims 24, 31, and 37 and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 24-26 and 28-48 pending in the present application are patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, withdrawal of the present final rejection and an early allowance of claims 24-26 and 28-48 pending in the present application are respectfully requested.

Respectfully Submitted,
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